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THE WINTER FLORA OF MUSKEGET ISLAND, MASSACHUSETTS.

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WHILE on Muskeget Island, Massachusetts, from November 24 to December 1, 1915, in the interests of the United States Biological Survey, the writer was enabled to make a collection of plants. The island was well covered and the collection is believed to be complete for the period indicated.

Muskeget is pure sand and is constantly being remodeled by wave action. The western side is now being worn away most rapidly. A keystone used by the Coast Guard was reset 27 paces inland during the spring of 1915, and in December it was apparent that the post would soon have to be moved again. It is said that formerly the island projected three-quarters of a mile farther on this side than it does now. Noticeable addition to the island seems to be limited to the southeast point.

The main body of Muskeget Island is approximately a semicircle with the diameter about a mile in length. The convex side is toward the north and at the southeast and southwest extremes are long points, the latter being much the longer. The south side of the island is occupied by 3 bays of which the middle one shoals off into a salt marsh which extends long arms into the body of the island. In the southeastern quarter of the island are a number of small fresh water marshes.

The strongest impression made by the vegetation of Muskeget Island, at the time the writer saw it, was due to the waving sea of straw-colored *Ammophila*. Dotted here and there were dark islands of which those occupying the elevations were largely composed of

beach plum, and those in the low spots of bayberry. Scattered among the *Ammophila*, and almost uniformly distributed were *Solidago sempervirens* and *Artemisia caudata*.

Nowhere has the writer seen poison ivy so common, nor so peculiar in habit. There being nothing on which to climb, it simply sprawls over the sand. It is vigorous, however, taking complete possession of some areas and producing an enormous crop of fruit. Indeed while walking over most parts of the island, one's footsteps are accompanied by a constant rattle of dislodged poison ivy fruits.

In the fresh water marshes, which in origin are detached extremities of arms of the salt marsh or depressions between old beaches, there is an interesting zonation of plants. The outer or shrubby zone is composed largely of bayberry and *Rosa humilis* threaded with *Rubus procumbens* and toward the inner side with *Spiraea tomentosa*, *Aster novi-belgii* and *Agrostis perennans*. The next zone, rather an indefinite one is that of *Scirpus cyperinus* and cat-tails. The inner basin of the marshes usually is a mass of *Juncus canadensis*, and *Aspidium thelypteris* with scattered *Scirpus cyperinus*. In one marsh this area is partly taken up by a bed of sphagnum and *Vaccinium macrocarpon*.

In the salt marsh, there is a strand zone where grow *Spergularia leiosperma* (found to some extent elsewhere), *Salicornia mucronata*, *S. europaea* and *Suaeda linearis*. The next zone is dominated by *Spartina patens*, among which are scattered *Limonium* and *Salicornia ambigua*. The next zone is occupied by *Spartina glabra* var. *pilosa*, beyond which no emerged vegetation appears, but submerged eel-grass is abundant.

The shrubs on Muskeget, particularly the beach plum, are covered with lichens, among which are *Lecanora varia* (Ehrh.) Ach., *Parmelia sulcata* Tayl., *Ramalina calicaris* (L.) Nyl., and *Usnea florida* (L.) Hoffm. Two lichens¹ grow commonly on the sand, namely, *Cladonia sylvatica* (L.) Rabenh. forma *laxiuscula* Del. and *Cladonia boryi* Tuck. forma *reticulata* (Russ.) Merl.

The number of species of vascular plants collected on Muskeget Island was 54 of which 9 seem clearly to have been recently introduced by man. A small patch of turnips was cultivated during the summer of 1915 and at the time of my visit there remained on this area some of the turnip plants, and a few pioneers of the irrepressible *Panicum*

¹ All of these lichens were kindly identified by Mr. G. K. Merrill.

capillare. On a single refuse heap near a fisherman's house were found the only specimens of mullein, wild carrot, *Raphanus raphanistrum*, *Poa pratensis*, *Triticum sativum*, and *Festuca rubra*, and only in the vicinity of fishing shacks were *Chenopodium album* and *Convolvulus sepium* obtained.

The vascular plants found on Muskeget Island belong to 23 families of which 16 are represented by only one species each; while the Rosaceae have 6 species, the Chenopodiaceae and Compositae 8 each, and the Gramineae 9 species.

Such is the general summary of the winter flora of a mile-wide and isolated sand patch twenty miles off the southern shore of Cape Cod, Massachusetts.

LIST OF SPECIES.¹

POLYPODIACEAE.

ASPIDIUM THELYPTERIS (L.) Sw.— The only fern present; abundant in fresh water marshes; covered with fruit dots.

TYPHACEAE.

TYPHA LATIFOLIA L.— Numbers present in a few of the fresh water marshes.

NAIADACEAE.

ZOSTERA MARINA L.— Exceedingly abundant in shoal waters surrounding Muskeget.

GRAMINEAE.

PANICUM CAPILLARE L.— Only in a little garden; mature fruit.

AGROSTIS PERENNANS (Walt.) Tuckerm.— The long, thin culms growing up among shrubs in the fresh water marshes.

AMMOPHILA ARENARIA (L.) Link.— The most abundant plant; mature fruit.

SPARTINA GLABRA Muhl. var. *PILOSA* Merr.— The outermost emerged plant of the salt marsh; mature fruit.

¹ Identification of plants mentioned in this list was kindly made by Professor M. L. Fernald, with the exception of 3 species of grasses named by Professor A. S. Hitchcock.

SPARTINA PATENS (Ait.) Muhl.— The dominant plant of the shallower parts of the salt marsh; spikelets fallen.

PHRAGMITES COMMUNIS Trin.— One considerable colony on rather high ground.

TRITICUM SATIVUM L.

POA PRATENSIS L.

FESTUCA RUBRA L.— Of the last two and of this species there was found only one tuft of each on a fisherman's refuse heap.

CYPERACEAE.

SCIRPUS CYPERINUS (L.) Kunth.— Common in fresh water marshes.

JUNCACEAE.

JUNCUS CANADENSIS J. Gay.— The dominant plant of the central parts of the fresh-water marshes; capsules empty.

MYRICACEAE.

MYRICA CAROLINENSIS Mill.— Abundant about margins of marshes and other damp spots; in full fruit.

POLYGONACEAE.

RUMEX ACETOSELLA L.— Very abundant, growing both in the open and in shade of other plants.

POLYGONUM ACRE HBK. var. *LEPTOSTACHYUM* Meisn.— Common in fresh marshes; mature fruit.

CHENOPODIACEAE.

CHENOPODIUM ALBUM L.— A few plants on fisherman's refuse heap.

ATRIPLEX PATULA L. var. *HASTATA* (L.) Gray.— Scattered rosettes seen; mature fruit.

ATRIPLEX ARENARIA Nutt.— Mature fruit.

SALICORNIA MUCRONATA Bigel.

SALICORNIA EUROPAEA L.— These two species on strand of salt marsh.

SALICORNIA AMBIGUA Michx.— Growing among *Spartina patens*.

SUAEDA LINEARIS (Ell.) Moq.— Scarce; mature fruit.

SALSOLA KALI L. Frequent; mature fruit.

CARYOPHYLLACEAE.

SPERGULARIA LEIOSPERMA (Kindberg) F. Schmidt.— Frequent on strand of the salt marsh.

ARENARIA PEPLOIDES L. var. *ROBUSTA* Fernald.— Several mats on Southwest point, scarce elsewhere.

CRUCIFERAE.

LEPIDIUM VIRGINICUM L.— Common, scattered everywhere; mature fruit.

CAKILE EDENTULA (Bigel.) Hook.— Frequent; flowers to mature fruit.

RAPHANUS RAPHANISTRUM L.— Only on fisherman's refuse heap.

ROSACEAE.

SPIRAEA TOMENTOSA L.— Frequent in shrub zone of the fresh water marshes.

FRAGARIA VIRGINIANA Duchesne.— In high dry situations; infrequent.

RUBUS PROCUMBENS Muhl.— Abundant; most plentiful in shrub zone of fresh water marshes.

ROSA RUGOSA Thunb.— One clump about 25 feet in diameter, which is known to have originated from a single bush brought ashore by the tide some 7 to 8 years ago; called "JAPANESE ROSE"; mature fruit.

ROSA HUMILIS Marsh.— Rose bushes are abundant and if the curved or straight shape of spines is a safe criterion, both this species and *R. VIRGINIANA* Mill. are represented. The straight-spined plants tend to be restricted to the higher ground, and those with curved spines to the swamps; fruit present.

PRUNUS MARITIMA Wang.— Abundant; apparently the only plant of economic value. The crop of fruit is said usually to be large.

LEGUMINOSAE.

LATHYRUS MARITIMUS (L.) Bigel.—Fairly common; confined to vicinity of shore.

ANACARDIACEAE.

RHUS TOXICODENDRON L.—Abundant, sprawling over the sand on higher ground and occupying some areas exclusively. The fruiting branches are erect, usually only a few inches high, and never over eighteen. In one instance seen climbing between shingles forming side of fisherman's house. Fruit very abundant.

HYPERICACEAE.

HYPERICUM VIRGINICUM L. Scarce in swamps; capsules empty.

ONAGRACEAE.

OENOTHERA MURICATA L.—Fairly common; mature fruit.

UMBELLIFERAE.

DAUCUS CAROTA L.—One plant on fisherman's refuse heap.

ERICACEAE.

VACCINIUM MACROCARPON Ait.—Plentiful in one fresh-water marsh which this plant and sphagnum are transforming into a bog; fruit present.

PLUMBAGINACEAE.

LIMONIUM CAROLINIANUM (Walt.) Britton.—Frequent in outskirts of salt marsh.

CONVOLVULACEAE.

CONVOLVULUS SEPIUM L.—A few plants near fishermen's cabins.

LABIATAE.

TEUCRIUM CANADENSE L. var. LITTORALE (Bicknell) Fernald.— Fairly common; mature fruit.

SCROPHULARIACEAE.

VERBASCUM THAPSUS L.— A few plants on fisherman's refuse heap.

COMPOSITAE.

SOLIDAGO SEMPERVIRENS L.— Abundant, scattered everywhere, still in flower.

ASTER NOVI-BELGII L.— Frequent in shrub zone of fresh water marshes, particularly on the inner border of this area; mature fruit.

GNAPHALIUM POLYCEPHALUM Michx.— Common on higher land; empty involucre.

XANTHIUM ECHINATUM Murr.— Not common; mature fruit.

ARTEMISIA CAUDATA Michx.— Abundant, scattered everywhere in drier soil; involucre empty.

ARTEMISIA STELLERIANA Bess.— Infrequent; involucre empty.

ERECHTITES HIERACIFOLIA (L.) Raf.— Common in both wet and dry situations; involucre empty.

LACTUCA CANADENSIS L.— Infrequent; mature fruit.

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